INDIAN STATISTICAL INSTITUTE

(MS-QMS)

MID-SEMESTER EXAMINATION

(Pattern Recognition)

Duration: 90 minutes   Maximum Marks: 40

Note: Answer all question

1.   [4]
    i.   Explain with examples for the attributes type: NOMINAL, ORDINAL, INTERVAL and RATIO.
    ii. Out of the properties Distinctness, Order, Addition and Multiplication, which attribute possesses what properties?

2. Explain, how the parameters of a box plot analysis can be used for outlier analysis.   [3]

3. What is Bayes Decision Rule for classification? Describe the merits and demerits of this classification rule.   [2+2+2]

4. If X is a data set with 9 samples and 2 features each. Find the Euclidean and Mahalanobis distances between 2nd and 5th samples of X. Explain the reasons for the different distance values.   [3+3+2]

$$XX =[4 \quad 5$$
$$3 \quad 2$$
$$3 \quad 2$$
$$1 \quad 6$$
$$0 \quad 2$$
$$5 \quad 7$$
$$7 \quad 9$$
$$3 \quad 7$$
$$2 \quad 1];$$

5. In a database of 20 samples, 8 samples belong to DOG category and 12 samples belong to CAT category. The model *M* classifies 6 DOGs and 6 CATs correctly. Develop the confusion matrix and find the *F-measure* of the model.   [3+6]

6. Describe briefly the process of Semisupervised and Reinforcement learning algorithms. Also mention the motivations for the need of these algorithms.   [3+3+2+2]